

## COMMONLY USED REAL-WORLD FORMULAS – Solving Literal Equations

<b>Accounting Formulas</b>	
$A = D + E$	(Assets = Debt + Equity)
$I = PRT$	(Simple Interest = Principal x Rate x Time)
$A = P \times (1 + i)^n$	(A = total repayment of loan, P = principal, i = interest rate, and n = number of payments in term of the loan)
<b>Automotive Formulas</b>	
$V_C = \pi/4 \times b^2 \times s$	( Cylinder volume = $\frac{\pi}{4} \times \text{bore}^2 \times \text{stroke}$ )
$H = (r/m \times t) / 5252$	(horsepower = rpm x torque / 5252)
$D_T = (\text{mph} \times R_G \times 336) / \text{rpm}$	(Tire diameter = (mph x gear ratio x 336)/rpm)
$\mu_R = v \times g/t$	( $\mu_R$ = coefficient of rolling friction, v= initial velocity, g = acceleration of gravity and t= time in seconds it takes to stop)
<b>Electronics Formulas</b>	
$P = VI$	(Power = Voltage x Current)
$E = Pt$	(Energy = Power x Time)
$f_x = \frac{1}{2\pi\sqrt{LC}}$	(where $f_r$ is resonant frequency in hertz, L is the inductance in henries, and C is the capacitance in farads)
$Z = \sqrt{R^2 + (X_L - X_C)^2}$	(where Z is Impedence, R is Resistance; $X_L$ is Inductive reactance and $X_C$ is Capacitive reactance)
<b>Health Sciences</b>	
$ABL = \frac{EBV \times (H_i - H_f)}{H_i}$	(Allowable Blood Loss = Estimated Blood Volume x (Initial Hematocrit – Final Hematocrit)/Initial Hematocrit)
$\frac{D}{H} \times Q = X$	(Desired dosage/Dosage on hand) x Quantity = amount to administer
$FR = \frac{V \times C}{T}$	(Flow rate = (Volume to be infused x tube calibration)/Time)
$BMI = \frac{\text{mass} \times 703}{\text{height}^2}$	Body Mass Index = quotient of (mass in lbs. x 703) and the square of height in inches
<b>Construction</b>	
$\frac{T \times W \times L}{12} = \text{Board Feet}$	(T = the thickness of the board in inches, W = the width of the board in inches, and L = the length of the board in feet)
$\text{Log Volume} = \frac{(D - 4)^2}{16}$	(where D is the diameter inside the bark measured in inches at the small end of the log and L is the nominal log length measured in feet)

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Name \_\_\_\_\_

**A formula is an equation that states a relationship among quantities represented by variables.**

In these exercises, assume that the variables represent real numbers that do not result in division by zero. Tell what steps are needed to transform the first formula into the second and name the property used.

1.  $P = VI$

$$\frac{P}{I} = V$$

2.  $I = PRT$

$$\frac{I}{R} = PT$$

3.  $H = (r/m \times t) / 5252$

$$5252H = r/m \times t$$

$$\frac{5252H}{t} = \frac{r}{m}$$

$$\frac{5252Hm}{t} = r$$

Solve for the indicated variable in the following problems.

4.  $E = Pt$  for  $P$

5.  $\mu_R = v \times g/t$  for  $g$

6.  $ABL = \frac{EBV \times (H_i - H_f)}{H_i}$  for  $EBV$

7.  $V_L = \frac{(D-4)^2}{16}$  for  $D$

8.  $\frac{D}{H} \times Q = X$  for  $Q$

9. Determine your Body Mass Index: substitute your weight and height into the formula

## COMMONLY USED REAL-WORLD FORMULAS – Solving Literal Equations ANSWER KEY

### Answer Key

1. Divide both sides of the equation by  $I \Rightarrow$  Division Property of Equality
2. Divide both sides of the equation by  $R \Rightarrow$  Division Property of Equality
3. Multiply both sides by 5252  $\Rightarrow$  Multiplication Property of Equality,  
Divide both sides by  $t \Rightarrow$  Division Property of Equality  
Multiply both sides by  $m \Rightarrow$  Multiplication Property of Equality
4.  $\frac{E}{t} = p$
5.  $\frac{\mu_R t}{v} = g$
6.  $EBV = \frac{ABL \times H_i}{(H_i - H_f)}$
7.  $D = \sqrt{16 \times V_L} + 4$
8.  $Q = \frac{XH}{D}$
9. Answers will vary